

**REMARKS**

Claims 1-4 are pending in this application. Claims 1-4 are herein amended. Reconsideration of the rejections in view of these amendments and the following remarks is respectfully requested.

**Withdrawn Objections and Rejections**

Applicants gratefully acknowledge that the objection to claims, rejection of claims under 35 USC §112, second paragraph, and double patent rejection in the previous Office Action have been withdrawn in view of the Applicants' previous response.

**Rejections under 35 USC §102(b)**

**Claim 1 was rejected under 35 USC §102(b) as being anticipated by Yoon et al. (U.S. Patent No. 5,368,764). Claim 1 was rejected under 35 USC §102(b) as being anticipated by Nishiyama et al. (U.S. Patent No. 4,174,421).**

Applicants respectfully traverse these rejections.

Claim 1 has been amended to "A ferromagnetic p-type single-crystal zinc oxide material consisting essentially of: 1 to 99 mol% manganese, a p-type dopant selected from a group consisting of C, N, and oxides thereof, and the balance p-type single-crystal zinc oxide, wherein said p-type single-crystal zinc oxide material having a hole concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or more and a low resistance of  $1 \Omega \cdot \text{cm}$  or less."

In Yoon et al., the Mn-Zn-based single crystal ferrite composition consists of 51 to 54 mole %  $\text{Fe}_2\text{O}_3$ , 27 to 33 mole % MnO and 16 to 20 mole ZnO. Thus, the material contains  $\text{Fe}_2\text{O}_3$ . In contrast, the ferromagnetic material of the present invention **consists essentially of: 1 to 99**

mol% manganese, a p-type dopant selected from a group consisting of C, N, and oxides thereof, and the balance p-type single-crystal zinc oxide, which exclude existence of  $\text{Fe}_2\text{O}_3$ .

In Nishiyama et al., the piezoelectric crystalline zinc oxide film contains vanadium (which allegedly is a p-type dopant) and manganese and the content of each of these additive elements is 0.01 to 20.0 atomic percent. In the present invention, however, p-type single-crystal zinc oxide includes a p-type dopant doped less than  $4 \times 10^{18} \text{ cm}^{-3}$ .

For at least these reasons, Yoon et al. and Nishiyama et al. do not teach or suggest “A ferromagnetic p-type single-crystal zinc oxide material consisting essentially of: 1 to 99 mol% manganese, a p-type dopant selected from a group consisting of C, N, and oxides thereof, and the balance p-type single-crystal zinc oxide, wherein said p-type single-crystal zinc oxide material having a hole concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or more and a low resistance of  $1 \Omega \cdot \text{cm}$  or less,” as recited in claim 1.

Thus, the 35 U.S.C. §102(b) rejections should be withdrawn.

#### **Rejections under 35 USC §103(a)**

**Claim 2 was rejected under 35 U.S.C. §103(a) as being obvious over Yoon et al. or Nishiyama et al. in view of Yamamoto et al.**

Applicants respectfully traverse this rejection.

Claim 2 has been amended to “A ferromagnetic p-type single-crystal zinc oxide material consisting essentially of: 1 to 99 mol% manganese, a p-type dopant selected from a group consisting of C, N, and oxides thereof, an n-type dopant selected from a group consisting of B, Al, In, Ga, Zn, and oxides thereof, and the balance p-type single-crystal zinc oxide, wherein said

p-type single-crystal zinc oxide material having a hole concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or more and a low resistance of  $1 \Omega \cdot \text{cm}$  or less.”

An argument similar to claim 1 can be applied to claim 2 regarding Yoon et al. or Nishiyama et al. Yamamoto et al. is cited for allegedly disclosing codoping of ZnO with a p-type dopant and a n-type dopant. Such disclosure, however, does not remedy the deficiencies of Yoon et al. and Nishiyama et al.

For at least these reasons, Yoon et al., Nishiyama et al. and Yamamoto et al. do not teach or suggest “A ferromagnetic p-type single-crystal zinc oxide material consisting essentially of: 1 to 99 mol% manganese, a p-type dopant selected from a group consisting of C, N, and oxides thereof, an n-type dopant selected from a group consisting of B, Al, In, Ga, Zn, and oxides thereof, and the balance p-type single-crystal zinc oxide, wherein said p-type single-crystal zinc oxide material having a hole concentration of  $1 \times 10^{18} \text{ cm}^{-3}$  or more and a low resistance of  $1 \Omega \cdot \text{cm}$  or less,” as recited in claim 2.

Thus, the 35 U.S.C. §103(a) rejection should be withdrawn.

**Claim 3 was rejected under 35 U.S.C. §103(a) as being obvious over Yoon et al. or Nishiyama et al. in view of Schetzina.**

Applicants respectfully traverse this rejection.

Claim 3 has been amended to “A method for manufacturing a ferromagnetic p-type single-crystal zinc oxide material, comprising steps of: holding a semiconductor substrate within a temperature range of 300-800 °C in a vacuum atmosphere of about  $10^{-8}$  Torr; supplying an atomic gas from a solid-state source of Zn or Zn oxide and an activated oxygen onto said semiconductor substrate to grow a single-crystal zinc-oxide thin film on the substrate while an

atomic p-type dopant selected from a group consisting of C, N, and oxides thereof and an atomic Mn are supplied all together onto the substrate at a partial pressure of about  $5 \times 10^{-7}$ .”

Yoon et al., Nishiyama et al., and Schetzina do not teach or suggest the particular conditions as recited in claim 3. For at least these reasons, claim 3 patentably distinguishes over Yoon et al., Nishiyama et al., and Schetzina.

Thus, the 35 U.S.C. §103(a) rejection should be withdrawn.

**Claim 4 was rejected under 35 U.S.C. §103(a) as being obvious over Yoon et al. or Nishiyama et al. in view of Schetzina, and further in view of Yamamoto et al.**

Applicants respectfully traverse this rejection.

Claim 4 depends from claim 3. Yamamoto et al. has been cited for allegedly disclosing codoping ZnO with a p-type dopant and a n-type dopant. Such disclosure, however, does not remedy the deficiencies of Yoon et al., Nishiyama et al., and Schetzina, discussed above regarding claim 3.

For at least these reasons, claim 4 patentably distinguishes over Yoon et al., Nishiyama et al., Schetzina and Yamamoto et al.

Thus, the 35 U.S.C. §103(a) rejection should be withdrawn.

If the Examiner believes that this application still is not in condition for allowance, the Examiner is requested to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Amendment under 37 C.F.R. §1.114  
Serial No. 10/049,615

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees that may be due with respect to this paper to Deposit Account No. 50-2866.

Respectfully Submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

A handwritten signature in black ink, appearing to read "Sadao Kinashi", written in a cursive style.

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